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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/940,917	08/28/2001	Gurtej Singh Sandhu	303.676US2	6986

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EXAMINER

VOCKRODT, JEFF B

ART UNIT PAPER NUMBER

2822

DATE MAILED: 06/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/940,917

Applicant(s)

SANDHU ET AL.

Examiner

Jeff Vockrodt

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on March 14, 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 44, 45 and 60-83 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 44, 60, 62-64, 66-68, 70-72, 74-77, 79-81 and 83 is/are rejected.
- 7) ☒ Claim(s) 45, 61, 65, 69, 73, 78 and 82 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

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DETAILED ACTION

This office action is in response to the amendment filed on March 14, 2003. Claims 44-45 and 60-83 are pending.

Claim Objections

Claim 45 is objected to as it depends from the cancelled claim 34. Claim 45 should depend from 44. Claim 45 will be examined on the assumption that this correction will be made in applicant's next response.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 44, 60, 62-64, 66-67, 72, 74-75, 77, 79, and 83 are rejected under 35

U.S.C. §§ 102(a), 102(e) as being anticipated by U.S. Pat. No. 5,924,012 ("Vaarstra").

Claims 44. Vaarstra teaches a contact structure (Fig. 1) including a titanium silicide layer (34) deposited at the bottom of a contact hole and a conformal titanium aluminum nitride layer (36) (col. 7, ll. 43-67).

Claim 60, 62-64, 66-67, 72, 74-75, 77, and 79. Vaarstra teaches a silicon substrate (16); a transistor (20, 22, 24, 26) coupled to the substrate (16) having an active region (20, 22); and

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an insulating layer (silicon dioxide 28) over the active region (20, 22); and a titanium alloy layer of titanium aluminum nitride (36) over a titanium silicide layer (34).

Claim 83. This claim is a product-by-process claim and is only limited only to the product produced by the claimed method steps and not the performance of the steps themselves. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself." In re Thorpe, 227 USPQ 964, 966 (Fed. Cir. 1985). The titanium aluminum nitride layer is produced according to the process disclosed by Vaarstra by combining both titanium and aluminum precursors without the use of a sequential deposition process employing reducing agents and seed layers as applicant has done. The specification contains no data comparing films deposited by both methods to prove that they produce materially different products. Accordingly, claim 83 is anticipated by Vaarstra, which appears to produce a product that is the same as that covered by the product-by-process claim 83.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 68, 70-71, 76, and 80-81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Vaarstra in view of U.S. Pat. No. 5,644,166 ("Honeycutt").

Vaarstra is discussed above in relation to claims 44, 60, 62-64, 66-67, 72, 74-75, 77, 79, and 83, but differs from claims 68, 70-71, 76, and 80-81 by not teaching BPSG as an insulating material 26.

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Honeycutt teaches using BPSG 16 as an interlevel dielectric layer in a high aspect ratio contact for the silicon dioxide insulating material (col. 2, ll. 23-37).

Vaarstra and Honeycutt are within applicant's field of endeavor--contacts structures for integrated circuits.

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize BPSG as the insulating layer (28) in the device taught by Vaarstra. One of ordinary skill in the art would have been motivated to use BPSG as it was known to be used for identical purposes by closely related contact structures as established by Honeycutt.

Allowable Subject Matter

Claims 45, 61, 65, 69, 73, 78, & 82 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 45, 61, 65, 69, 73, 78, & 82 are allowed for the reasons set forth in the office action mailed July 18, 2002.

Response to Arguments

Applicant's arguments with respect to claims 44, 60, 62-64, 66-68, 70-72, 74-77, 79-81, and 83 have been considered but are moot in view of the new ground(s) of rejection.

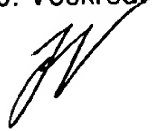
Conclusion

Any inquiry concerning communications from the examiner should be directed to Jeff Vockrodt at (703) 306-9144 who can be reached on weekdays from 9:30 am to 5:00 pm EST. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian, can be reached at (703) 308-4905.

The fax numbers for this Group are (703) 305-3432, (703) 308-7722, (703) 305-3431, and (703) 308-7724. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist at (703) 308-0956.

June 1, 2003

J. Vockrodt



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